Psychiatric Disorders and Commercial Motor Vehicle Driver Safety

Findings of Evidence Report

Presented by

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Psychiatric Disorders and Potential Crash Risk

- Potential risk of a motor vehicle crash among individuals with the following psychiatric disorders:
  - Psychotic disorders
  - Mood disorders
  - Anxiety disorders
  - Personality disorders

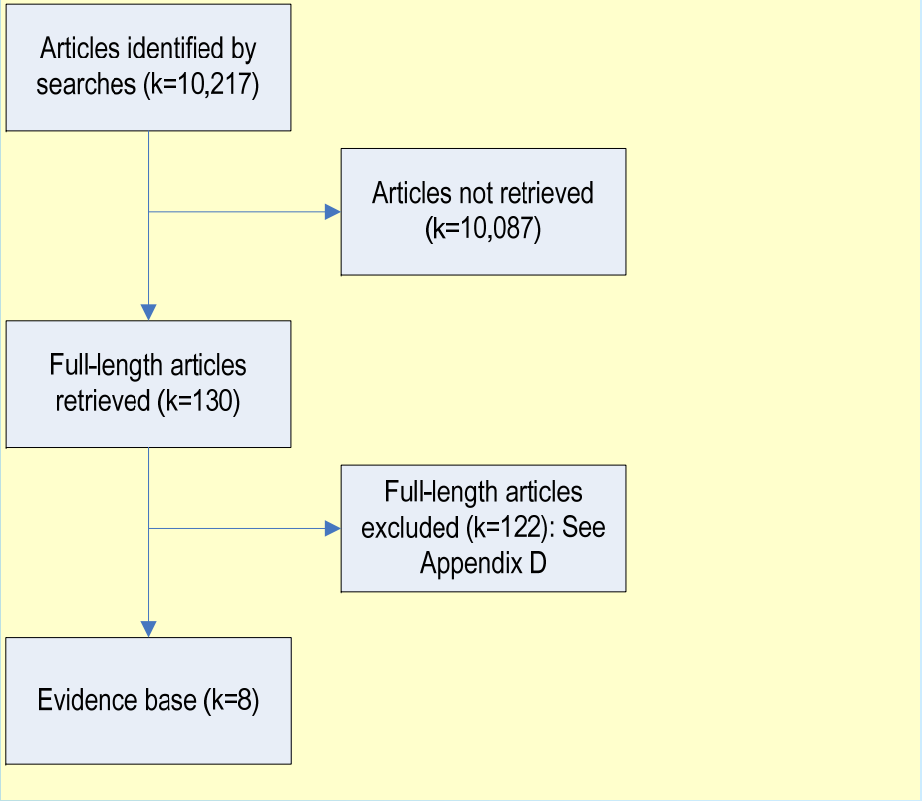
Key Questions

- **Key Question 1**
  - Are individuals with a psychiatric disorder at an increased risk for motor vehicle crash?
  - If so, are there specific psychiatric disorders that present a particularly high risk?

Key Questions

- **Key Question 2**
  - Are individuals using psychotherapeutics for a psychiatric disorder at an increased risk for crash when compared to individuals not using psychotherapeutics?
- **Key Question 3**
  - What traits associated with personality disorders are associated with reductions in motor vehicle driver safety?

Key Question 1:
Psychiatric Disorders and Crash Risk



- 8 studies included
- No CMV drivers
- 7 Cohort ,1 Case control
- Quality = 6 low, 2 moderate

Key Question 1: Psychiatric Disorders and Crash Risk

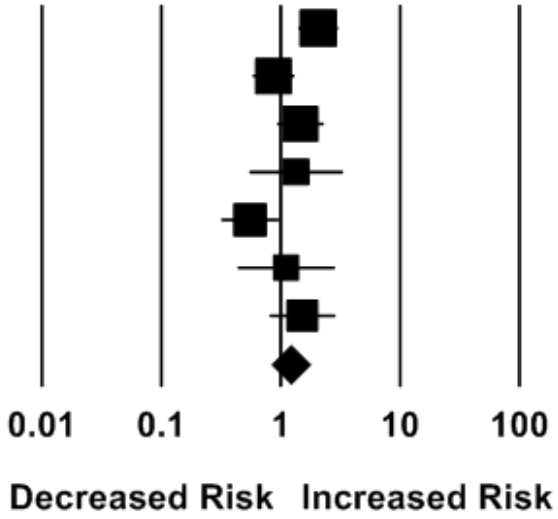
- Crash Studies
  - All cohort studies compared drivers with psychiatric disorders to a control population without psychiatric disorders. The case-control compared the prevalence of psychiatric disorders among drivers who crashed to drivers who did not crash.
  - None of the studies differentiated between crashes during active symptoms and crashes occurring when symptoms were not present.

Key Question 1: Psychiatric Disorders and Crash Risk - Results

Study name	Rate ratio	Lower limit	Upper limit	Z-Value	p-Value
Waller	2.063	1.395	3.052	3.626	0.000
Buttiglieri	0.872	0.576	1.320	-0.649	0.517
Crancer	1.466	0.925	2.323	1.630	0.103
Armstrong	1.345	0.541	3.346	0.638	0.523
Wear	0.555	0.315	0.977	-2.042	0.041
Edlund	1.111	0.431	2.867	0.218	0.828
Foley	1.520	0.797	2.899	1.271	0.204
Summary	NC	0.827	1.730	0.950	0.342

Statistics for each study

Rate ratio and 95% CI



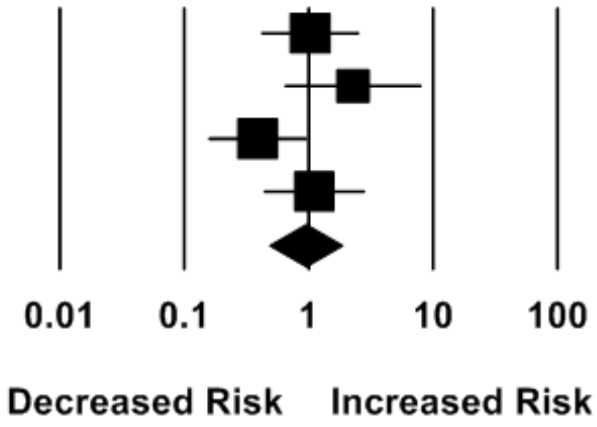
Key Question 1: Psychiatric Disorders and Crash Risk - Summary

- **The evidence concerning crash risk for drivers with psychiatric disorders is inconclusive. The possibility of an increased risk of crash for some drivers with psychiatric disorders cannot be ruled out (Strength of Evidence: Minimally Acceptable).**

Psychotic Disorders and Crash Risk - Results

Study name	Rate ratio	Lower limit	Upper limit	Z-Value	p-Value
Crancer	1.028	0.411	2.576	0.060	0.952
Armstrong	2.273	0.634	8.146	1.260	0.208
Wear	0.390	0.155	0.979	-2.006	0.045
Edlund	1.111	0.431	2.867	0.218	0.828
Summary	0.933	0.475	1.833	-0.201	0.841

Statistics for each study



Psychotic Disorders and Crash Risk - Summary

- **Currently available evidence does not suggest an increased crash risk for individuals with psychotic disorders when compared to individuals without these disorders, but an increased crash risk cannot be ruled out (Strength of Evidence: Minimally Acceptable).**

Mood Disorders and Crash Risk - Results

Reference	Year	Condition	Effect size (95% CI)	P =	Evidence of increased crash risk?
Armstrong and Whitlock	1980	Depression	RR = 1.520 (0.797 – 2.899)*	0.204	No
Foley et al.	1995	Depression	OR = 1.7 (0.9 – 3.1)	NR	No
Koepsell et al.	1994	Manic depression	RR = 1.069 (0.340-3.358)*	0.909	No

Mood Disorders and Crash Risk - Summary

- **Although evidence suggests the possibility that individuals with mood disorders are at an increased risk for a motor vehicle crash when compared with drivers who do not have mood disorders, more evidence is needed to reach a firm conclusion.**

Anxiety Disorders and Crash Risk - Results

- One study reported crash risk for individuals with anxiety disorders.
- Crash rate ratio: 1.47 (95% CI 0.67 to 3.19), p = 0.334

Anxiety Disorders and Crash Risk - Summary

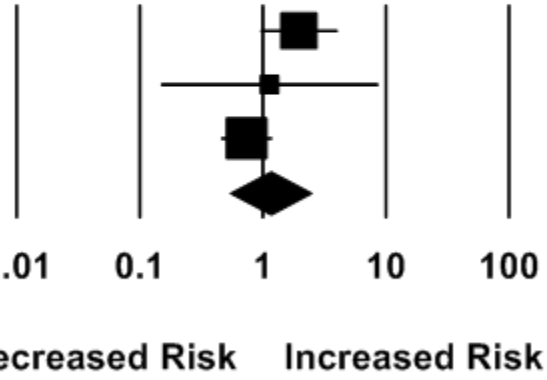
- **A paucity of evidence prevents us from being able to draw an evidence based conclusion about the effects of anxiety disorders on the risk of motor vehicle crash.**

Personality Disorders and Crash Risk - Results

Study name	Rate ratio	Lower limit	Upper limit	Z-Value	p-Value
Crancer	1.969	0.944	4.108	1.807	0.071
Armstrong	1.136	0.147	8.802	0.122	0.903
Wear	0.739	0.453	1.207	-1.209	0.227
Summary	NC	0.532	2.446	0.339	0.735

Statistics for each study

Rate ratio and 95% CI



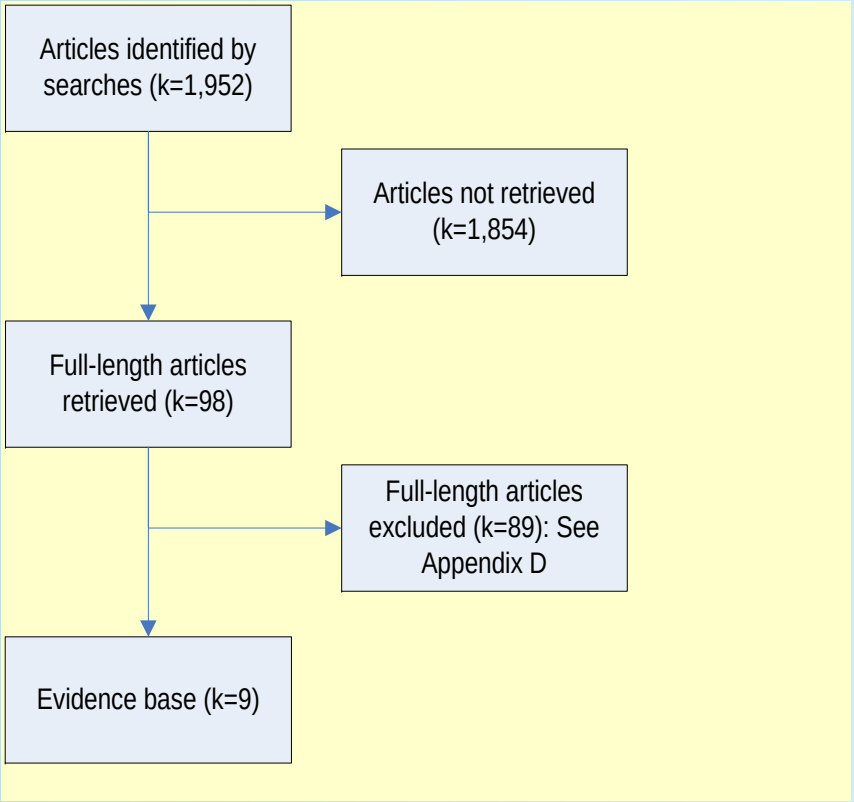
Personality Disorders and Crash Risk - Summary

- **Due to inconsistencies in the available evidence, we are precluded from drawing an evidence-based conclusion pertaining to the strength of the relationship between personality disorders and crash risk at this time.**

Key Question 2: Psychotherapeutic Drugs and Crash Risk

- Psychotherapeutic drugs may affect cognitive and psychomotor abilities that could contribute to crash risk
  - Anxiolytics
  - Antipsychotics
  - Antidepressants

Key Question 2: Psychotherapeutic Drugs and Crash Risk



- 9 studies included
- No CMV drivers
- 6 case control, 2 cohort, 1 survey
- Quality = 3 low, 6 moderate

Benzodiazepines and Crash Risk

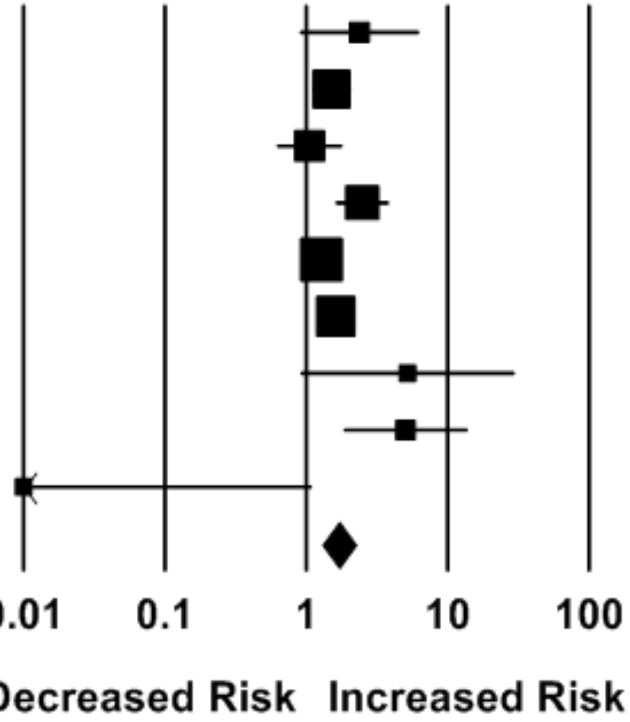
- Benzodiazepines are the largest class of anxiolytics, and the only anxiolytics evaluated in crash studies.
- Some benzodiazepines are hypnotics, used for insomnia.
- Only 5 studies separately reported data for anxiolytics and hypnotics.
- We analyzed all 9 studies initially, then performed a subgroup analysis on 5 studies with separate data for anxiolytics.

Benzodiazepines and Crash Risk - Results

Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
Honkanen	2.378	0.891	6.353	1.729	0.084
Ray	1.509	1.092	2.085	2.494	0.013
Leveille	1.056	0.612	1.823	0.195	0.845
Neutel	2.488	1.598	3.875	4.034	0.000
Hemmelgarn	1.280	1.125	1.456	3.747	0.000
Barbone	1.620	1.239	2.118	3.526	0.000
McGwin	5.200	0.901	30.022	1.843	0.065
Movig	5.050	1.818	14.026	3.107	0.002
Wadsworth	0.010	0.000	1.100	-1.920	0.055
Summary	NC	1.283	2.204	3.762	0.000

Statistics for each study

Odds ratio and 95% CI

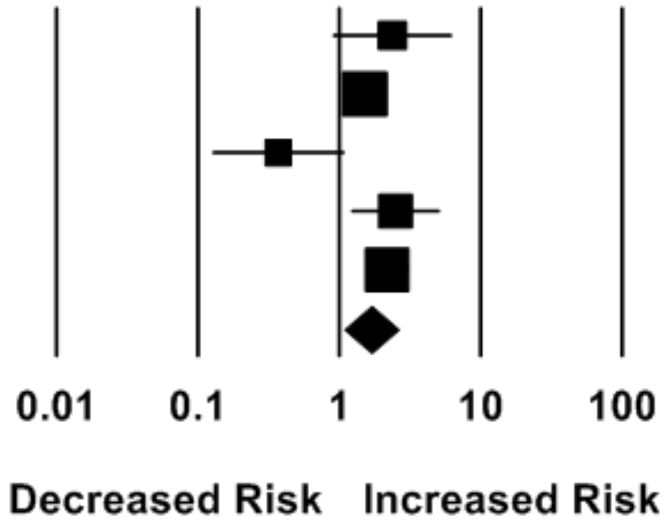


Benzodiazepines and Crash Risk - Summary

- **Benzodiazepine use is associated with an increased risk for a motor vehicle crash. (Strength of Evidence: Moderate)**

Benzodiazepine Anxiolytics and Crash Risk - Results

Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
Honkanen	2.378	0.891	6.350	1.729	0.084
Ray	1.509	1.092	2.085	2.494	0.013
Leveille	0.371	0.125	1.099	-1.789	0.074
Neutel	2.500	1.201	5.204	2.450	0.014
Barbone	2.180	1.519	3.128	4.229	0.000
Summary	NC	1.072	2.576	2.271	0.023



Benzodiazepine Anxiolytics and Crash Risk - Summary

- **Benzodiazepine anxiolytic use is associated with an increased risk for a motor vehicle crash. (Strength of Evidence: Minimally Acceptable)**

Benzodiazepine Exposure Time and Age Group - Summary

- **Crash risk may be greater during the first week of an index prescription of benzodiazepines. (Strength of Evidence: Minimally Acceptable)**
- **Crash risk may be greater among benzodiazepine users ≤40 years of age. (Strength of Evidence: Minimally Acceptable)**

Antipsychotics and Crash Risk

- One study found no excess crash risk within two to four weeks of index prescription. However, the 95% CI was too large to rule out possibility of increased risk.
- **Summary: The evidence concerning crash risk associated with antipsychotic use is inconclusive. The possibility of an increased crash risk associated with antipsychotic use cannot be ruled out.**

Antidepressants and Crash Risk

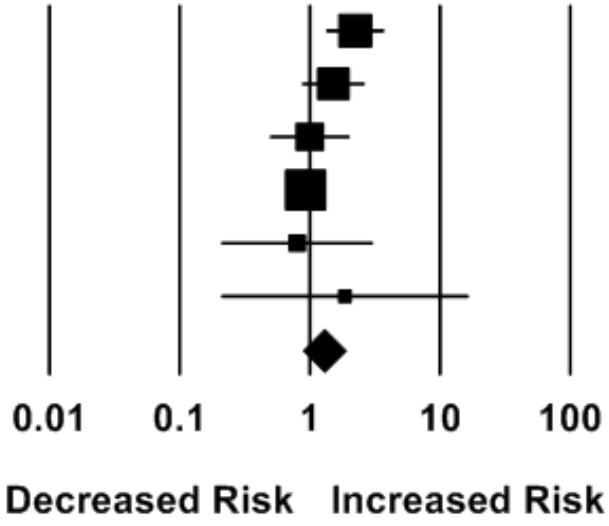
- Seven of nine studies that evaluated benzodiazepine use also evaluated antidepressant use and possible crash risk
- Included tricyclic antidepressants (TCAs) and selective serotonin uptake inhibitors (SSRIs)
- 3 studies evaluated TCAs only, 2 studies evaluated TCAs and SSRIs, and 2 studies did not specify type of antidepressants evaluated

Antidepressants and Crash Risk - Results

Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
Ray	2.230	1.322	3.762	3.006	0.003
Leveille	1.515	0.859	2.674	1.434	0.152
Neutel	1.000	0.488	2.049	0.000	1.000
Barbone	0.930	0.717	1.206	-0.548	0.584
McGwin	0.800	0.207	3.098	-0.323	0.747
Movig	1.862	0.206	16.823	0.554	0.580
Summary	NC	0.873	1.854	1.252	0.211

Statistics for each study

Odds ratio and 95% CI

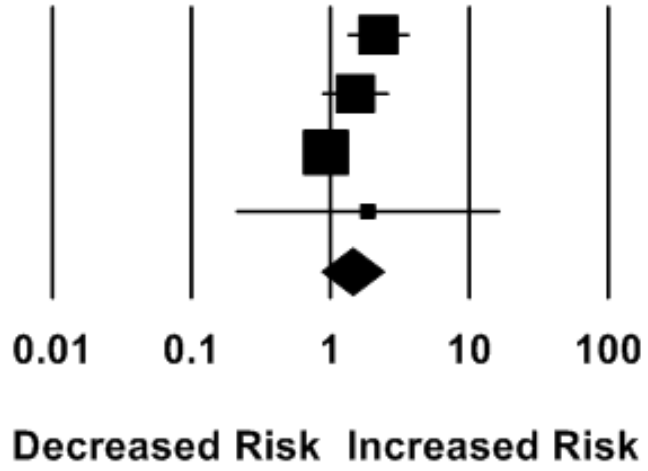


TCAs and Crash Risk - Results

Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
Ray	2.223	1.318	3.750	2.994	0.003
Leveille	1.515	0.859	2.673	1.434	0.152
Barbone	0.930	0.717	1.206	-0.548	0.584
Movig	1.862	0.206	16.827	0.553	0.580
Summary	NC	0.849	2.384	1.340	0.180

Statistics for each study

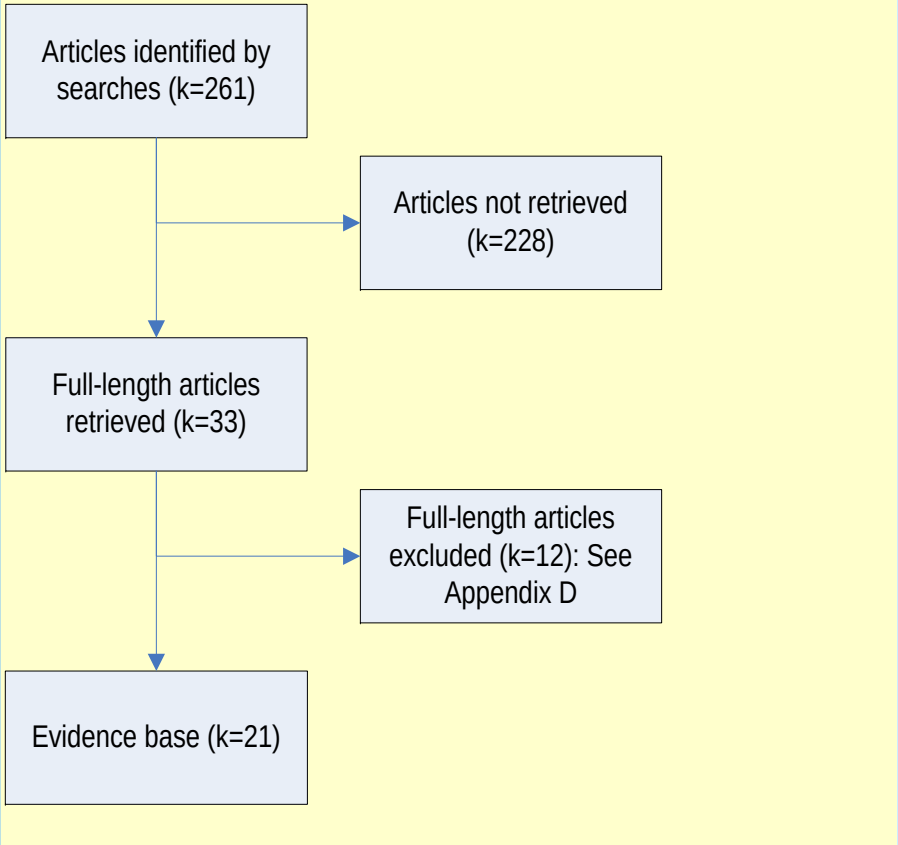
Odds ratio and 95% CI



Antidepressants and Crash Risk - Summary

- **The evidence concerning crash risk associated with antidepressant use is inconclusive. The possibility of an increased crash risk associated with antidepressant use (particularly tricyclic antidepressant [TCA] use) cannot be ruled out. (Strength of Evidence: Minimally Acceptable)**

Key Question 3:
Personality Disorder Traits and Crash



- 21 studies included
- 8 cohort, 5 case control, 8 survey
- Quality = 18 low, 6 moderate

Traits Associated with Personality Disorders and Crash Risk

- Three studies focused on select CMV driver populations
- Generalizability of the remaining 18 studies to CMV drivers was unclear

Traits Associated with Personality Disorders and Crash Risk

- Traits evaluated in studies included hostility, aggression, impulsivity, and sensation seeking.
- 24 separate testing instruments used.
- Outcomes, variables, and instruments in different studies too heterogeneous to combine.

Traits Associated with Personality Disorders and Crash Risk - Results

	Aggression	Hostility	Impulsivity	Attitude toward traffic violations	Psychological symptoms	Risky driving	Violations of traffic laws
Crash	●	●	●	●	●	●	●
Risky driving	●	NA	●	●	●	_	●
Violations of traffic laws	●	NA	NA	NA	NA	●	_
Aggression	_	NA	NA	NA	●	●	●

Traits Associated with Personality Disorders and Crash Risk - Summary

- The evidence suggests that individuals with traits associated with personality disorders are at an increased risk for a motor vehicle crash when compared with comparable drivers who do not have a trait associated with a personality disorder.
- These traits include aggression, hostility, impulsivity, disregard for law (i.e. attitude toward traffic law violations), and various psychological symptoms.

Traits Associated with Personality Disorders and Crash Risk - Summary

- However, inconsistencies in the methodologies of the included studies preclude us from drawing an evidence-based conclusion pertaining to the strength of the relationship between traits associated with personality disorders and crash risk at this time.